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REPORT

ON

FOREST ADMINISTRATION

IN THE

CHOTA NAGPORE DIVISION

OF

BENGAL,

BY

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INSPECTOR-GENERAL OF FORESTS TO THE GOVERNMENT OF INDIA.

WITH ONE MAP.

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INTRODUCTION.

Forest conservancy in the Chota Nagpore Division attracted attention many years ago. In 1871, Captain Losack, Deputy Conservator of Forests, made a rapid inspection of the Division, followed in 1872 by a journey down the Brahmani River from Singhbhoom to Cuttack. In 1873, as Conservator of Forests in Bengal, I examined the Palamow Forests, and drew up a Memorandum on forest operations in that sub-division and in the adjoining territories. On the proposals then submitted, an area of 178 square miles was taken under management. Subsequently, this area was further increased. In 1875, the Saranda Forests, covering an area of 400 square miles, were declared reserved forests, and in 1876, the Koderma Forest, covering an area of 60 square miles, was added.

Subsequently, Mr. J. Sykes Gamble, Officiating Conservator of Forests in Bengal, visited Chota Nagpore, and arranged for the demarcation of additional areas in Singhbhoom and Lohardugga.

2. During the last six years, Mr. J. F. K. Hewitt, C.S., Commissioner of the Division, has taken a special interest in forest conservancy, and done his best to further this branch of the administration; and the possibility of extending protection to the large zamindari forests has, more especially, occupied his attention. In consequence, most parts of the Division have, during the last three years, been examined by Messrs. Johnston, Fuchs, Heinig, and Lillingston, of the Forest Department, with the view of ascertaining the position and extent of the more important private forests.

3. In August last the Government of India directed me to proceed to Chota Nagpore, and to assist in the discussion of the questions at issue. I arrived at Giridi on the 7th December, marched through Hazaribagh and Lohardugga to Singhbhoom, inspected the reserves and proposed reserves in that district, and returned, by a different route, through Lohardugga and Hazaribagh to Giridi, which I reached on the 6th February. Thus I spent in all two months in the Division, and it is evident that I could only see certain parts, representing typical specimens of the lands to be dealt with.

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* Being under orders to proceed to England, I had only a few days to write this Report, and I was not able to pass it finally through the press.

4. Little information is available regarding the Manbhoom Forests. What is said regarding the forests in the Tributary States is based on notes kindly furnished me by the Commissioner, Mr. Hewitt. Even as regards the remaining three districts, the available information is incomplete, and no attempt could be made to give an accurate or exhaustive account of the forests of the Division, nor could I do more than indicate roughly the line of action which commends itself at the present time.

5. In addition to Mr. Hewitt, I am indebted for information to Mr. A. L. Home, Conservator of Forests in Bengal, and to Mr. F. Bruce Manson, Deputy Conservator of Forests, Chota Nagpore Division. I had the pleasure of spending some days in camp with Mr. Hewitt, while Messrs. Home and Manson accompanied me throughout my tour of inspection.

CHAPTER I.

GENERAL.

1.—Sketch of Chota Nagpore.

6. The Chota Nagpore Division consists of four districts and a number of Tributary States. Lohardugga occupies the centre, with the Ranchee plateau, stretching to the north-west up to the banks of the Soane river; the latter half is called the Palamow Sub-Division. To the north of Lohardugga is the Hazaribagh District; on the east of both, Manbhoom; to the south of Manbhoom and Lohardugga, Singhbhoom is situated, as well as the Tributary States of Bonai and Gangpur; to the west of Lohardugga are situated the Tributary States of Udaipur, Jashpur, Sarguja, Korea, and Chang Bhakar.

Configuration of the Country.

7. The configuration of this territory may be shortly described as follows. Entering Manbhoom from the Bengal plains of Bankura, the ground is found to rise up to the boundaries of Lohardugga and Hazaribagh, where an elevated plateau is reached, situated, generally speaking, from 1,200 to 1,300 feet above the level of the sea. This plateau may be called the lower Nagpore plateau. On proceeding further west, two higher plateaux, those of Ranchee and Hazaribagh, are met, which are situated about 2,000 feet above the level of the sea. The Ranchee plateau occupies an area of about 4,500 square miles, and that of Hazaribagh of about 600 square miles. At the extreme west they are joined by a high neck of land from which the Damoodur River takes its rise. Running in an easterly direction, the latter separates the Hazaribagh from the Ranchee plateau. On the north-western slopes of this high neck the North Koil, and its feeder the Ouranga, take their rise, and the territory drained by them and another feeder called the Amanat, which comes from the Hazaribagh plateau, form the Palamow Sub-Division. To the west of Lohardugga the high land continues until it joins the Satpuras and Vindhias. The lower Chota Nagpore plateau mentioned above, sweeping round from the western part of Manbhoom, takes in the Singhbhoom District. As already mentioned, this upland gradually falls on the east towards the Bengal plains. The northern face, on the other hand, which forms the boundary of the Hazaribagh District, shows an almost precipitous fall of about 800 feet down to the level of the Gya plain, except where Monghyr and the Sonthal Pergunnahs adjoin the Hazaribagh District. Here the upland gradually runs out through these districts until it finally disappears near Rajmahal, in the great bend of the Ganges.

Hills.

8. Although the general configuration of the country is represented by a series of plateaux, there is really very little level ground found throughout the division. The plateaux are everywhere undulating and intersected by numerous more or less connected hill ranges and by isolated peaks. To begin with, there is an almost continuous series of ranges beginning in Manbhoom and running near the southern edge of the Lohardugga District, that is to say, in a direction from east to west; then, from the ridge connecting the Ranchee and the Hazaribagh plateaux, a series of high spurs run into Palamow, converting the southern and eastern part of that Sub-Division into an exceedingly hilly tract, some of the hills reaching a height of 3,600 feet. Manbhoom may be said to be formed of low swelling ridges, with isolated hills scattered over them. The highest of these is Dalma, 3,407 feet; then Panchkot 1,600 feet; Gangabari and others. From the southern edge of Lohardugga numerous spurs run into Singhbhoom, giving the northern part of that district a broken aspect. A separate range of hills rises between Chakardharpur and Chybassa, which gradually extends as it runs on in a south-westerly direction, until it converts the whole of the Saranda Sub-Division into a complicated net-work of hills and valleys. Saranda is called "the land of the seven-hundred hills."

Rivers.

9. It has already been stated that the North Koil with its feeders drains the Palamow Sub-Division. The South Koil takes its rise a few miles west of Ranchee, runs in a westerly direction until nearly opposite the source of the North Koil, then turns to the south, passes through the west of Singhbhoom, and joins the Sankh River in Gangpur, forming with it the Brahmani River. The Damoodur, which, as already stated, takes its rise on the ridge connecting the Hazaribagh and Ranchee plateaux, drains the northern slope of the latter and the southern slope of the former, then passes through the northern part of Manbhoom, takes in the Barakar at Niamatpur, passes through Burdwan, Bankura, Hooghly and Howrah, and joins the Hooghly River opposite Fulta. The Barakar drains the north-eastern part of the Hazaribagh District. The north-western part of Hazaribagh is drained by a series of rivers, the Mohani, Lilajan and Morhar, which, after passing through the Gya District, run into the Ganges. The eastern slopes of the Ranchee plateau, the southern part of Manbhoom, and the western half of Singhbhoom, are drained by the Subarnrekha and its feeders, which joins the sea to the north of Balasore. The central part of Manbhoom has the Kushai River, which passes through Bankura and Midnapore to the Hooghly.

Geological Formation.

10. In a general way it may be said that the prevailing rocks in the Hazaribagh District, Lohardugga proper, and the southern half of Palamow are gneiss, granite and other crystalline formations, with certain coal-bearing strata. In the northern half of Palamow many of the hills are capped with sandstone and laterite. Singhbhoom consists partly of metamorphic and partly of sub-metamorphic rocks, with a considerable number of trap dykes. Manbhoom consists in a great measure of metamorphic rocks, with a good deal of laterite towards the east. Ironstone is found in all four districts, and coal in Hazaribagh, Lohardugga, Manbhoom, and several of the Tributary States.

11. Almost throughout the division the soil is of a reddish colour, sometimes more clayey and sometimes more of a sandy description. During the hot weather it has a dry, baked appearance. Generally speaking, and compared with the surrounding districts, the soils of the Chota Nagpore Division are mostly of inferior quality.

2.—The Forests of Chota Nagpore.

Distribution of Sâl in India.

12. The sâl tree (*Shorea robusta*) appears in India in two great tracts. The first forms a belt commencing in the Kangra District of the Punjab, and running along the foot and outer hills of the Himalayas through Saharanpur, Dehra Dun, Garhwal, Kumaun, Oudh, Nepal, Darjeeling Terai, Western and Eastern Duars, then crossing the Brahmaputra, following the lower portion of the Garo Hills and extending into Mymensingh. The second tract is situated to the south of the Ganges River, and its centre may be said to be the Ranchee plateau. On the north it extends across the Soane River, and up through the Sonthal Pergunnahs to the banks of the Ganges, near Rajmehal. On the east through Manbhoom into Bankura and Midnapore, on the south through Singhbhoom, the Tributary States of Chota Nagpore and Orissa to the western part of the Orissa Division, into the northern districts of the Madras Presidency; on the west through the Chhattisgarh Division of the Central Provinces well into the Mandla District; and an isolated patch is found near Pachmarhi.

It will be seen that the whole of the Chota Nagpore Division is situated within the sâl region.

Classification of the Forests.

13. Chota Nagpore may be described as having originally consisted of one vast sea of sâl forest, from which the more isolated hills stood out, covered with what may be called upper mixed forest. Again, in some of the lower parts, as in Palamow, sâl forest is replaced by lower mixed forest. In Appendix III of this Report will be found a list of trees and shrubs which have been noticed in Chota Nagpore. It is no easy matter to arrange the various species according to these three classes of forests, as most of them appear under all conditions, and a distinction can only be made by considering the greater or lesser frequency of the various species. Moreover, cultivation has stepped in and cleared a great part of the country, commencing with the more level parts, and then proceeding to the slopes and higher plateaux.

14. Sâl forest is now found throughout the level and undulating ground in all four districts. It covers also the lower slopes around the several hill-ranges, but on the upper part of the hills, in Hazaribagh and Lohardugga, it is generally replaced by mixed forest. In Singhbhoom, on the other hand, and in the hill ranges which run along the southern edge of Lohardugga, sâl forest goes up to the highest hills. The quality of the sâl forest depends on the quality of the soil; in other words, the best forests are situated in the valley. Here, tall and straight trees, with a girth of upwards of 15 feet, may be seen, while in the upper parts of the hills the trees remain short, and rarely reach a girth of more than 5 feet.

15. In the valley, and generally in sheltered situations, the principal companion of sâl is Terminalia tomentosa, which frequently even out-numbers sâl. Next come Gmelina arborea, and Diospyros melanoxylon. Of other important timber trees, the following may be mentioned:—Schleichera trijuga; Adina cordifolia; Pterocarpus Marsupium; Stephegyne parvifolia; and, here and there, Cedrela Toona. There is also a fair sprinkling of Terminalia Chebula, while Bassia latifolia is found everywhere. In the inferior class of sâl forests on the upper parts of the hills, sâl is accompanied principally by Anogeissus latifolia, Buchanania latifolia, Lagerströmia parviflora, Ougeinia dalbergioides, and Dendrocalamus strictus.

The undergrowth in the sâl forests consists principally of Woodfordia floribunda, Holarrhena antidysenterica, Croton oblongifolius, Lebedieropsis orbicularis (principally in Singhbhoom), several species of Gardenia and Randia, Symplocos racemosa, and others.

16. The mixed forests on the upper hills consist principally of Anogeissus latifolia; in the dry and rocky parts, of Boswellia thurifera, and, in some parts, of Dendrocalamus strictus. These are accompanied by Cassia fistula, Bassia latifolia, Bauhinias, Phyllanthus emblica, Terminalia bellerica, Ougeinia dalbergioides, Sterculia urens and others.

17. The lower mixed forest, which appears principally in Palamow, and probably in Manbhoom, contains a large proportion of Acacia Catechu, accompanied by Terminalia tomentosa, Butea frondosa, Zizyphus Jujuba, and others.

Distribution of the Forests.

18. In a general way it may be said that the Hazaribagh and Ranchee plateaux contain now comparatively little forest. What remains in these two districts is chiefly situated along the northern edge of Hazaribagh, in the southern half of Palamow, on the hills running between Palamow and Lohardugga Proper, in the Damoodur Valley, and along the southern edge of the Lohardugga District. Little is known about Manbhoom and the eastern half of Singhbhoom, beyond the existence of extensive forests along the boundary between these two districts. The western half of the Singhbhoom District may be described as one enormous forest, in which only limited areas have been cleared for cultivation. There, especially in Saranda, almost virgin sâl forest is still found, and this is said to run on through the Bonai State. Mr. Hewitt describes the forests in the latter State as follows:—

"The forests of Bonai are situated on the volcanic range of hills south of Saranda, separating the valley of the Brahmani from that of the Baitarani River in Keonjhar, and on the west of the Brahmani covering the hilly country formed by the spur running from north-east to south-west, thrown out by the central range to the east of the river. The Brahmani cuts its way through these spurs. The whole country, except the narrow tract of level land along the Brahmani, and a fairly large area of half-cleared and cultivated land amongst the eastern hills, is covered with almost untouched and virgin forest, and the timber throughout is magnificent. The whole area of the forest tract is not much less than 2,000 square miles. The trees are chiefly sal, asan, dhauta, and bija sâl, the last being especially fine, and in the valleys along the numerous hill-streams there are nearly, if not quite, the finest Kuram and Terminalia Arjuna trees I have ever seen. The Anogeissus acuminata is to be found, but is more frequent along the Ib and its tributaries than in the valley of the Brahmani. The whole forms the finest forest I have ever seen in India. It will be difficult to bring the greater part of this timber to the Bengal and Nagpore Railway, owing to the difficulty of crossing the transverse ranges running from north-east to south-west on the west of the river, and to the distance of the country to the east of the river from the Railway. The difficulties of transport caused by distance would be greatly increased by the steepness of the hills on which the forests are situated. The best means of dealing with this forest would be by opening up the Brahmani, so as to allow of timber being floated down. But considerable supplies of timber for railway transport can be obtained from that part of the western forests which is on the border of Bamra and Gangpur, from whence timber can be taken without difficulty to the proposed line of Railway."

The eastern half of Gangpur is said to contain little timber now, but well stocked forests exist still in the west, and on the hills along the boundary between Jashpur and Udaipur, as well as in the north of Jashpur.

19. Generally, it should be mentioned that smaller areas, covered principally with sâl, are found scattered over the whole division wherever the larger forest tracts have disappeared. These are generally preserved for the supply of saplings and small poles to the adjoining villages.

3.—Demands on the Forests.

Requirements of the Population.

20. The people use very large quantities of forest produce wherever it is available within reasonable distance. It may be useful to mention

here the following details. The favourite kinds of timber used of large dimensions are as follow :—

Sagar wheels (cart wheels).—Terminalia tomentosa and Terminalia Arjuna.

Oil mills.—Sal; Bassia latifolia; Terminalia tomentosa.

Ploughshares.—Sal; Anogeissus latifolia; Bassia latifolia.

Plough shafts.—Sal and Ougeinia dalbergioides.

Yokes.—Sal; Ougeinia dalbergioides, and a species of Grewia.

House building and furniture.—Sal; Pterocarpus Marsupium; Ougeinia dalbergioides; Eugenia Jambolana; Diospyros melanoxylon; Anogeissus latifolia; Terminalia tomentosa; Lagerströmia parviflora; Terminalia Chebula; Dalbergia latifolia; Adina cordifolia; Melia Azadirachta.

Coffins.—Boswellia thurifera.

Cart-axles.—Anogeissus latifolia; Ougeinia dalbergioides; Terminalia Chebula.

Rice-pounders.—Sal.

Rice-pestles.—Bassia latifolia; Diospyros melanoxylon, and Dalbergia latifolia.

Banghy poles.—Grewia tiliæfolia.

Drums.—Gmelina arborea.

Sandals.—Dalbergia latifolia; Pterocarpus Marsupium; Buchanania latifolia; Alangium Lamarckii.

Bells.—Gmelina arborea.

Of other produce the following items may be mentioned :—

Bamboos.—Used for roofing, fencing, baskets, mats, umbrellas, horns, flutes, &c.

Fencing and walling.—Sal; Woodfordia floribunda; Lebedieropsis orbicularis; Croton oblongifolius.

Ropes.—Bauhinia Vahlii; sabai grass (Eriophorum); Helicteres Isora.

Mats.—Split bamboos; Phœnix sylvestris; Ph. acaulis.

Articles of food.—Mohwa flowers; leaves of Bauhinia variegata, and Antidesma Ghæsembilla; flowers of Indigofera pulchella; fruits of Ficus Cunia, F. glomerata, F. religiosa, F. bengalensis, Eugenia Jambolana, Grewia salvifolia, Gardenia gummifera, Buchanania latifolia, Diospyros melanoxylon, Mango, Zizyphus Jujuba, and Semecarpus Anacardium; seeds of Bauhinia Vahlii, &c.

21. *Articles of trade.*—Besides what the people use for their own consumption, they carry on a small trade principally in the following articles :—

Timber and fuel, sabai grass, lac (grows on Schleichera trijuga, Butea frondosa, and other trees), Tussur cocoons, wax, honey, mohwa flowers and seeds (for oil), seeds of Celastrus paniculatus (for oil); fibres of Bauhinia Vahlii, thatching grasses; Sâl and Bauhinia Vahlii leaves (plates and wrappers); cutch (from Acacia Catechu); palm leaves (for mats), &c.

As the Kóls wear very little clothes, dyes are not in much requisition.

The above data apply more particularly to Singbhoom.

The lac is bought by a number of factories which produce principally shell-lac. The manufacture of dyes in connection with lac has almost completely been given up, as it is not sufficiently remunerative.

Requirements of Public Works.

22. These requirements have hitherto been almost entirely confined to sâl beams for the construction of public buildings and bridges, and to a large numbers of sâl sleepers which have been cut and exported to the East Indian Railway; no information is available regarding the number so exported.

23. The Bengal-Nagpore Railway is about to be commenced. It starts from Sitarampur on the East Indian Railway, and passes through Manbhoom, Singhbhoom, and Gangpur into the Central Provinces. Its length in Bengal is about 200 miles, for which about 400,000 broad-gauge sleepers will be required, besides considerable quantities of timber and fuel for construction, brick-burning, etc. Subsequently, the line in Bengal will require some 30,000 sleepers a year for renewals. A second line of railway from Benares to Cuttack will pass Chota Nagpore for a length of about 250 miles, requiring 500,000 sleepers, and, hereafter, perhaps 40,000 a year for renewals. To sum up, for sleepers alone the following quantities of timber are required :—

First construction, 900,000 sleepers, or 4,500,000 cubic feet of timber in the rough.

Subsequent renewals, 70,000 sleepers, or 350,000 cubic feet annually.

Requirements of Industries.

24. Some timber is required for mining, but the quantities are comparatively small. Possibly charcoal may hereafter be required for iron-smelting, but as the establishment of that industry is doubtful it may be omitted for the present.

CHAPTER II.

AREA OF THE FORESTS.

1.—General.

25. The area and population of the Chota Nagpore Division are given in an abstract form in the subjoined table :—

District.	Area, in square miles	Population		Number of Houses		Percentage of increase of population during 9 years, 1872 to 1881
		Total	Per square mile.	Total	Per square mile	
Hazaribagh	7,021	1,104,742	157	193,481	28	43
Lohardugga	12,045	1,609,244	134	294,925	24	30
Singhbhoom	3,753	453,775	121	86,306	23	43
Manbhoom	4,147	1,058,228	255	181,945	44	29
Total .	26,966	4,225,989	157	756,657	28	34
Tributary States	16,054	678 002	42	112,564	7	36
Grand Total .	43,020	4,903,991	114	869,221	20	34

It will be noticed that the Tributary States show an average density of population of 42 per square mile; as this is a very low figure, and as large tracts of forest are known to exist in them, it may safely be assumed that no urgent need exists for further interference than can conveniently be exercised by the Commissioner of the Division during his annual tours of inspection.

26. The density of population in the British districts ranges from 121 per square mile in Singhbhoom to 255 in Manbhoom, with an average for the

four districts of 157 per square mile. There are, on an average, 28 houses per square mile, and about six people in each house. No data are at present available which show the quantity of forest produce consumed or required annually. Observations in the adjoining Central Provinces have shown that the minimum quantity required annually per head of population amounts to about 12 maunds. Applying this information to the British districts of Chota Nagpore, the people would require annually, at least, 50 million maunds of forest produce, for the production of which, under existing circumstances, some 5,000 square miles are required, apart from the requirements of Public Works, including railways, industries, &c.

27. From the table given above, it will be seen that the population has, during the nine years from 1872 to 1881, increased 34 per cent., and, at this rate, it would double itself in some 25 years. Moreover, very considerable quantities of produce are exported to several of the adjoining Bengal and Behar districts, which are poor in forests. Taking these facts into consideration, it may safely be stated that the forest area of these uplands should not be less than one-fourth of the total area, or about 7,000 square miles in a round figure.

28. The greater portion of Chota Nagpore is permanently settled, and not even approximate data could be obtained showing at present the area under cultivation, and the area of forest and waste lands. A general inspection of the country has proved that the destruction of the forests is proceeding at a rapid rate. Extensive areas are cleared annually for dhaia (temporary) cultivation ; in some parts the sâl trees are still sacrificed in large numbers for the production of dammar (dhuna or resin). The people use, recklessly, far larger quantities of produce than are actually required for their comfort; what remains now of mature sâl trees in the zamindari estates is being rapidly converted into sleepers and beams and exported to Bengal, while fires do great damage in many parts of the country. The only signs of conservancy are found in some parts of the country where the forest area has already been reduced below what is required for local use. Here, limited areas are set aside for the supply of the adjoining villages with saplings and small poles.

29. The importance of taking early steps towards the conservation of an adequate forest area has strongly forced itself upon the present Commissioner, Mr. Hewitt, who has for some years urged the adoption of suitable steps. In his Annual Administration Report for 1883-84 he writes as follows :—

"248. I have already, in the account of my tour, pointed out the rapid destruction of private forests that is in progress, and the destruction will increase very rapidly as soon as the division is traversed by railways. Railways will inevitably be followed by mining works and manufactures on a large scale, and the local demand for timber, supplemented by the largely increased demand from the neighbouring districts, will become enormous, and will lead to the early consumption of all the good timber available, unless measures are taken to preserve it.

"249. Besides the increased demand for large timbers, the increase of cultivation and the peopling of tracts now covered with jungle will cause all the hill-sides to be denuded of forests, thereby reducing the rainfall, choking the rivers with earth and sand washed from the hills, and turning what would be, if properly preserved, valuable forest tracts into bare and barren soils.

"250. As soon as population increases below the hills—increases to such an extent as to clear away all the jungle on the low lands—the destruction of the hill jungle proceeds most rapidly. All the good trees are sold to contractors, the saplings are taken away in thousands to build the ryots' houses, which are made of poles placed close together and covered with earth, to make hedges for their gardens, and to serve as manure on their fields, while the cattle and goats effectually prevent the young trees still left from even growing beyond the height at which they can be browsed.

"251. The misfortune resulting from this wholesale destruction, not only to the Chota Nagpore country, but to the Bengal districts lying below the plateau, will be incalculable, and

I do not see how this can be averted, unless a system of intelligent forest conservancy can be applied to all forest lands, whether public or private, which it is considered necessary to preserve for the public benefit."

30. The necessary forest area can be secured in various ways:—

(i) By the preservation of the lands still at the disposal of Government.

(ii) By the preservation of forests situated in private estates.

(iii) By the acquisition, by purchase or lease, of private lands, and their preservation as forests.

2.–Government Forest Lands.

31. Before Government can proceed to enforce forest conservancy in private estates, it is necessary that it should conserve as forests as large a proportion of Government lands as is practicable, taking into consideration other requirements. The following areas have, up to date, been set aside or selected for forest reserves, under Chapter II of the Indian Forest Act, VII of 1878.

Hazaribagh District.

(1) *The Koderma* Reserve, area 47 square miles; reserved in 1876, but subsequently modified. It is situated in the north of the district adjoining the Gya boundary. It consists principally of sâl forest, but contains only sapling and small poles.

(2) The *Khurchuta* Proposed Reserves, estimated area 10 square miles, consisting of two blocks, which have lately been selected for reservation. They contain small sâl coppice shoots, and will require protection for a considerable period before they can be expected to yield produce.

Total area in Hazaribagh 57 square miles.

Lohardugga District.

	Square miles.
(3) The *Palamow* Reserves,	area 183
,, ,, Proposed Reserves	,, 11
TOTAL	194

The reserves were first taken under management in 1873, but various changes in the areas occurred until they were finally gazetted in 1879. They are situated in the southern half of Palamow. The bulk consists of sâl forest, some of which still contains mature timber in limited quantities. A part of the reserves consists of mixed forest, with a considerable area stocked with bamboos.

(4) The *Horhap* Reserve, area 2 square miles, situated 10 miles to the east of Ranchee. It consists of sâl and mixed forest.

Total area in Lohardugga 196 square miles.

Singhbhoom District.

(5) The *Saranda* Reserve, area 312 square miles, was first taken up in 1875, but finally reserved in 1882. It is situated in the south-west of the district. It consists of sâl forest of good quality in the lower parts, and of inferior quality on the upper parts of the ridges, and contains considerable quantities of mature timber.

(6) The *Kolhan* Reserves, area 209 square miles, are situated to the north-east of Saranda, and consist of sâl forest; here and there they contain mature timber.

(7) The *Porohat* Proposed Reserves, area 207 square miles, are about to be finally gazetted under Section 19 of the Forest Act. They are situated in the north-west of the district, adjoining Lohardugga; and consist chiefly of sâl forest, with mature timber in some parts.

Total area in Singhbhoom 728 square miles.

Manbhoom District.

No reserved forests have been constituted in *Manbhoom*.

32. The following data show the percentage of each district which has been brought under conservancy by Government:—

District.	Area, in square miles.		Percentage of reserved forests to total area.
	Total.	Area of reserved forests.	
Hazaribagh	7,021	57	0·8
Lohardugga	12,045	196	1·6
Singhbhoom	3,753	728	19·4
Manbhoom	4,147	...	...
Total .	26,966	981	3·6

It will be seen that the area of reserves comes to less than 4 per cent. of the total area, and that that area is very unevenly distributed. While Singhbhoom shows 19 per cent. of its area as reserves, Manbhoom has none at all. Although it has been stated above that the forest area of Chota Nagpore is being rapidly reduced, there are considerable tracts which will always remain under forest or jungle of some sort, so that Government need not attempt to secure 25 per cent. of the total area; but with only 4 per cent. in the hands of Government, there is great risk of the forest area being speedily reduced below what is required. Efforts must therefore be made to bring the area under Government control, for the present, up to at least 10 per cent., or, say, 2,500 square miles.

33. With this object in view all available areas should be added to the reserves. Unfortunately, very little land remains in the hands of Government. It is believed that none is available in Hazaribagh. In Lohardugga Proper about 15 square miles of forest lands are available in 37 Government villages of the Barkagar estate, in the vicinity of Ranchee. This area consists of a considerable number of blocks, some of which are of small extent, but in several cases two or more adjoin each other. Further enquiry will show how much of the area can with advantage be permanently maintained as forest; but it is believed that about eight square miles can be so secured. In Singhbhoom a sufficient area of reserves has been secured, but, unfortunately, it is all situated in the western half of the district. There are no Government lands in the eastern half. In Manbhoom, two Government estates, Mahtah and Koilapal, are said to contain forest lands, and they will be examined at an early date. Nothing is known of the area which may be secured in these estates.

To sum up, it is evident that the lands at present at the disposal of Government will not enable us to raise the area of reserved forests to more than 4 per cent. of the total area, or, in a round figure, to more than 1,000 square miles, of which 728 are situated in Singhbhoom and 194 in Palamow.

3.—Private Forests.

34. Owing to the inadequacy of the Government forest lands, efforts have been made to bring private forests under conservancy. With this object in view, most of the private forests in Hazaribagh and Lohardugga have, during

the last few years, been inspected by officers of the Forest Department. The information so collected has proved the existence of the following forests which deserve attention:—

Hazaribagh.

Name of Pergunnah.	Name of forest tract.	Area of forest, in acres.			
		Sal.	Bamboo.	Mixed.	Total.
Ahuri	Chattra	755	24,066	...	24,821
Kaiudi	Amkudur	5,641	...	...	5,641
Chaie	Chauparan	2,092	6,045	3,649	11,786
Gawan and Satgawan and others.	Gawan	46,074	4,115	131,154	181,343
Serampore	10 blocks	31,274	...	...	31,274
Palganjo	5 „	6,515	...	...	6,515
„	Parasnath	6,510	6,741	9,660	22,911
Guria and Champa	Kutkumsandi	7,610	...	10,395	18,035
Karanpura	Sathpahari	7,179	...	...	7,179
„	Maudi	33,923	...	1,797	35,720
Palani	Salgu	976	4,838	..	5,814
Jagesar	Jumra	35,065	6,893	7,184	49,142
„	Khurmatand	892	...	...	892
Rampur	Gobindpur	4,410	987	22,060	27,457
Gola	Duburud	12,526	...	...	12,526
„	Petarburh	9,513	3,097	12,778	25,388
	Total	210,985	56,782	198,677	466,444

Lohardugga.

Name of Pergunnah.	Name of Forest.	Area of forest, in acres.			
		Sal.	Bamboo.	Mixed.	Total.
Tori	Tori, west	...	8,840	...	8,840
„	„ east	16,460	...	...	16,460
„	Pipra Pani	...	7,840	..	7,840
„	Mahlan	...	...	10,280	10,280
„	Dudimati	4,000	...	...	4,000
Kasmar	Pittar	17,720	...	...	17,720
„	Korgo	13,880	...	...	13,880
Kasmar and Khukra	Tissia Salaia	33,360	7,280	...	40,640
Biru	Biru No. 1	..	20,160	..	20,160
„	„ „ 2	...	...	36,864	36,864
„	„ „ 3	37,184	...	...	37,184
Bhowrpahar	Bhowrpahar	24,472	...	...	24,472
Bano	Bano No. 1	1,024	...	...	1,024
„	„ „ 2	5,504	..	...	5,504
Basia	Basia No. 1	58,811	185	...	58,996
„	„ „ 2	1,152	...		1,152
„	„ „ 3	17,152	185	2,562	19,899
„	„ „ 4	4,560	...	448	5,008
Belsian	Belsian „ 1	16,960	486		17,446
„	„ „ 2	15,482	...	7,655	23,137
Tamar	Tamar	93,792	8,320	21,760	123,872
	Total	361,513	53,296	79,569	494,378

35. The above data, in the abstract, give the following results:—

District.	Principal Private Forests.	
	Area, in square miles.	Percentage of total area of District.
Hazaribagh	729	10·4
Lohardugga	772	6·4

If these areas were added to the Government forests, the percentage in Hazaribagh would be 11·2, and in Lohardugga 8. Besides the areas already enumerated, important forests are known to exist in the Kunda Hills, and in Palgungo, in Hazaribagh; also in the south-western part of Palamow; and in Paika, Chatra, and Jonha to the east of Ranchee. No exact data are available regarding the areas of these forests, but they may be estimated at not more than 300 square miles. Manbhoom and the eastern half of Singhbhoom have not yet been examined, but it is intended to examine them at an early date.

36. Returning, for the present, to the Hazaribagh and Lohardugga Districts, the question arises, how can the permanent preservation of the zamindari forests be secured? As the areas were all alienated by the permanent settlement of Bengal, nothing can be done under the ordinary revenue laws. The Indian Forest Act deals, in Chapter VI, with the control over forests and lands not being the property of Government, and it makes provision as follows:—

(i) Under Section 35, Government can interfere with forest devastation, when such a step appears necessary for the general benefit of the country. The section runs as follows:—

The Local Government may, from time to time, by notification in the local official Gazette, regulate or prohibit in any forest or waste land—

(*a*) the breaking up or clearing of land for cultivation;

(*b*) the pasturing of cattle;

(*c*) the firing or clearing of the vegetation;

when such regulation, or prohibition, appears necessary for any of the following purposes:—

First.—For protection against storms, winds, rolling stones, floods and avalanches;

Second.—For the preservation of the soil on the ridges and slopes, and in the valleys of hilly tracts, the prevention of land-slips and of the formation of ravines and torrents, and the protection of land against erosion, or the deposit thereon of sand, stones or gravel;

Third.—For the maintenance of a water-supply in springs, rivers and tanks;

Fourth.—For the protection of roads, bridges, railways and other lines of communication;

Fifth.—For the preservation of the public health.

If the owner does not attend to the regulations and prohibitions, Government may place the areas under the management of a Forest Officer, and apply all, or any of, the provisions of the Forest Act to them. Section 37, however, provides, that the owner may at any time, not less than three, or more than twelve, years after the enforcement of the restriction, require Government to acquire the land in question for public purposes.

(ii) Under Section 38 of the Forest Act, the owner of any land may ask Government —

(*a*) that such land be managed on his behalf by the Forest Officer as a reserved or a protected forest, on such terms as may be mutually agreed upon; or

(*b*) that all or any of the provisions of the Forest Act be applied to such land.

In either case Government may apply to such land such provisions of the Forest Act as it thinks suitable to the circumstances, and as may be desired by the applicant.

37. Action under Section 35 comes to this: Government can enforce forest conservancy in private lands, if it can show that the measures are required in the general interests of the country, which may not always be easy, or possible, in the case of any particular piece of land; moreover, the owner can force the Government to buy the land.

38. Action under Section 38 depends entirely on the consent and the wishes of the owner. The Commissioner of Chota Nagpore has hitherto held that action under Section 38 would be practicable, and he has, in consultation with the Civil and Forest Officers, drawn up a set of rules, which will be found in Appendix I of this Report. These rules regulate —

(i) The procedure to be followed in the case of applications made by zamindars under Section 38 (*a*); and

(ii) The management of the areas in question.

They prohibit, amongst others, the following acts without the previous permission of the Forest Officer:—

(*a*) Felling, girdling, lopping or burning, or otherwise damaging any reserved tree.

(*b*) Quarrying stone, burning timber or charcoal, collecting or removing any forest produce.

(*c*) Clearing land for cultivation, for building, for herding cattle, or for any other purpose.

(*d*) Setting fire to the forest, or kindling a fire without taking reasonable precautions to prevent its spreading into such forest.

(*e*) Leaving burning any fire kindled in the vicinity of such forest.

(*f*) Grazing cattle within such forest.

The above rules, in their present shape, have not the force of law, and the restrictions imposed under them cannot be enforced, or punishment inflicted for their breach. This difficulty could be got over by proceeding as laid down in Section 38 of the Act.

39. So far, however, the action taken has not led to any results. The Commissioner writes, as follows, in paragraph 245 of the Administration Report for 1883-84:—

"During the past year, the Deputy Commissioners of Hazaribagh and Lohardugga did all they could to induce the zamindars of their districts to apply for assistance from the Government officers for the preservation of their forests, but their efforts seem to have, so far, proved unsuccessful. The rules prepared last year for the preservation of zamindari forests were circulated among the zamindars, who were requested to give their views on them; and no opportunity was lost by the Deputy Commissioners in explaining them to such of the zamindars as they came across in the course of their cold-weather tours."

40. It appears that altogether three applications have been received:—

(i) From the Manager of the Serampore Court of Wards' Estate, for the preservation of the forests in the estate, measuring about 60,000 acres.

(ii) From the Rajah of Kaindi, for the preservation of a block measuring about 5,600 acres.

(iii) From the Rajah of Palganjo, for the preservation of five blocks, covering an area of about 5,500 acres.

The Kaindi case is peculiar. The Rajah's application, under Section 38, was forwarded to the Forest Officer on the 17th July 1884. Subsequently, it

seems to have been ascertained that the Rajah had actually leased the forest in question to a contractor, with effect from the 1st January 1883, so that his application can hardly have been meant in earnest. He has since died, and almost the whole of his estate has been sold in execution of decrees of the Civil Court.

The areas in Palganjo were, on inspection by a Forest Officer, found to be of inferior quality; the zamindar and the villagers were discourteous to the examining officer, and the ryots were quite prepared to dispute the ownership of the tracts in question, so that no further steps have, up to date, been taken.

The Serampore forests were examined by a Forest Officer, and 31,274 acres, forming 10 blocks, were selected for preservation. Of these blocks, several are cut up by cultivated lands, and it is doubtful whether, ultimately, even one-half of that area will really be found suitable for the formation of permanent forest estates. Moreover, the owner is now 18 years old, and when he comes of age, he is not unlikely to try to have the arrangement cancelled.

41. As long as Chota Nagpore is governed by a Commissioner who exercises great personal influence over the zamindars, and who takes an interest in forest conservancy, some success may be obtained in inducing certain zamindars to take action under Section 38 of the Forest Act; but if these conditions should change, the arrangements are sure to collapse again, and no permanent good can be expected in this respect.

42. It has already been pointed out that action under Section 35 is beset by considerable difficulties. Under these circumstances, an alteration of the existing law would naturally suggest itself, under which the forests could be preserved, without forcing Government to buy them, if called upon by the owners to do so. This could be done by cancelling the second clause of Section 37, either generally, or, as a special case, for the Chota Nagpore Division. In this respect the Commissioner writes as follows in his Administration Report for 1883-84:—

"In all European Continental countries it has been found necessary to oblige all private owners of forests, which it is considered necessary to preserve, to subject their forests to regulations laid down by Government, and I can only say that the sooner the forest establishments can be increased sufficiently, so as to permit of zamindari as well as Government forests being supervised by the Forest Department, the better it will be for Chota Nagpore, and those parts of Bengal which are supplied with timber from the forests of the division; and the longer such a measure, together with the necessary legislative changes, is delayed, the greater will be the amount of work thrown on the Forest Department, and the difficulty and delay in providing timber required to meet the demands of the market."

From these remarks it would appear that the Commissioner contemplates even more than the cancellation of the second clause of Section 37, and that he wishes to enlarge the powers at present given in Section 35 of the Forest Act. Some such action will, no doubt, become necessary, not only in Chota Nagpore, but also in other parts of India; but it is very doubtful whether the Government of India is, at present, prepared to legislate in this direction. It was only lately, in a case referring to Bombay, considered advisable not to re-open, for the present, the question of forest legislation, and, under these circumstances, I am not prepared to press for it in the case of Chota Nagpore.

43. This being so, the attempts to induce zamindars to take action under Section 38 of the Act may be continued, but for the rest, steps should, in my opinion, be taken to increase the Government forest area by the acquisition of forest lands by lease or purchase.

4.—Acquisition of Forest Lands.

44. By the permanent settlement the Government has surrendered its power to preserve a sufficient forest area for the requirements of the people and of public works. It may be argued that the forests being in the hands of the zamindars, the duty of Government towards the ryots ceases. On this principle, however, the Bengal Tenancy Act would have no *raison d'etre*. Moreover, other points must be considered. Public works require timber; the climatic influences of the forests, as well as their action on the water-supply, on the prevention of torrents, the deposit of sand, &c.; the protection of roads, bridges, railways, and other lines of communication must not be lightly set aside. To mention only one instance, it is well known that floods in the Damoodur River have, at various times, done considerable damage in Burdwan; that damage is likely to be increased, in the same measure as the forests in the upper catchment basin of the river are further cleared.

45. The question whether it would be better to lease the forest lands, or to buy them, must depend on circumstances: It is now the general practice to lease the forests in Chota Nagpore to contractors, for periods ordinarily not exceeding twelve years. Difficulties may be experienced in negotiating leases for longer terms, but these may, in many cases, be overcome, more especially if, in the case of non-compliance, the Government is prepared to take up such lands under Act X of 1870.

46. The purchase of forest lands can only be carried out on a limited scale, and the measure should, therefore, be restricted to the most important forest tracts. The net surplus of the Bengal Forest Department has now reached the sum of three lakhs of rupees a year, and the Government would be justified in setting aside out of this a sum of one lakh of rupees a year, for, say, the next five years, for the acquisition of forest lands in Chota Nagpore.

5.—Course of action.

47. The suggestions made in the previous paragraphs may be summed up as follows:—

In addition to the forest areas at the disposal of Government, it is desirable, in the general interests of the country, that a certain portion of the zamindari forests shall be brought under permanent conservancy. To achieve this object, the following course of action is recommended—

(i) Endeavours must be made to come to reasonable terms with the zamindars under Section 38 of the Indian Forest Act.

(ii) If this is found impracticable, attempts must be made to negotiate leases of the areas on behalf of Government, for long terms and renewable on their expiration.

(iii) If the zamindars object to come to a satisfactory arrangement, either under one or the other of these two methods, Government must proceed to acquire the lands under the Land Acquisition Act, X of 1870.

48. If the present proposals are accepted, it will be of the greatest importance to restrict the interference of Government to those cases in which action is absolutely required; in other words, the list of areas which Government is determined to take up under Act X of 1870, if their preservation cannot be otherwise insured, must be worked out in the most careful manner. The information at present at my disposal does not enable me to do this, and the task must be undertaken by the local officers. In the mean time, attention may be drawn to the more important tracts.

Action is, in the first instance, required in order to obtain control over a sufficient forest area—

(i) Along the northern edge of Hazaribagh.

(ii) In the catchment basin of the Damoodur River.

(iii) On the Chota Nagpore plateau.

When these parts have been dealt with, the operations should be extended to the hills between Lohardugga Proper and Palamow, to the south-western part of Palamow, to Manbhoom, and to the eastern half of Singhbhoom.

49. The areas so far examined in Hazaribagh and Lohardugga have been enumerated in paragraph 34 of this Report. They comprise upwards of 1,500 square miles, and afford a wide field of action to the Forest Department. The work of final selection must be done by the principal Forest Officer of Chota Nagpore. From the commencement of the next camping season a Civil Officer, invested with the necessary powers, should be associated with him, who can at once take the necessary steps, either for drawing up the conditions agreed upon under Section 38 of the Forest Act, or concluding a lease, or proceeding under Act X of 1870, as may be required in each case.

50. In some cases the procedure may be much simplified. I understand that estates are constantly sold under decrees of the Civil Courts. Arrangements should be made to inform the Forest Department of all forthcoming sales of estates, so that it can appear as a competitor, if the lands are suitable for forest conservation. In other cases it may be practicable to acquire lands by private purchase. All such opportunities should be carefully made use of.

51. As regards the investment of, say, 5 lakhs of rupees in the purchase of forests, although the returns will be small at first, the outlay is sure to be remunerative in the end. The zamindars are rapidly consuming, not the interest legitimately derivable from their forests, but the capital as well, and forest produce must soon rise in price throughout the division.

52. The measures hitherto taken have been somewhat half-hearted, and consequently have borne no results, while the forests are rapidly disappearing. Half measures will no longer suffice, and Government must now decide, either to give up all attempts to secure the maintenance of the zamindari forests and of a sufficient forest area generally, or to proceed on some such lines as now proposed.

CHAPTER III.

ORGANIZATION.

53. There is no need at present for lengthy remarks under this head, as the final organization depends on the orders which may be passed on the present proposals. The forest business in the Chota Nagpore Division is entrusted to a Chief Forest Officer of the rank of Deputy Conservator of Forests, whose official relationship with the Commissioner of the Division and the Conservator of Forests, Bengal, is as follows:—

The Conservator of Forests controls all professional, departmental and financial matters, and, in so far, the Deputy Conservator is directly subordinate to him. For the rest he is subordinate to the Commissioner of the Division. The correspondence between the Conservator and the Deputy Conservator is arranged in two classes. That in the one class is sent direct, and that in the

other passes through the Commissioner. The latter can stay action in any case, but he must at once inform the Conservator of having done so. In case of a difference of opinion, the matter is submitted to the Local Government for orders.

54. All other Forest Officers in Chota Nagpore are subordinate to the Deputy Conservator of the division. At present one officer of the controlling staff is stationed in Singhbhoom and one in Palamow. If additional areas are brought under management in Hazaribagh, Lohardugga, and perhaps Manbhoom, it will be necessary to strengthen the staff by the appointment of Sub-Assistant Conservators and Rangers. Whether additional Assistant Conservators will be required must be left for future consideration.

55. If action in the sense of the present proposals is decided on, it will be advisable to employ at once a few extra subordinates, so as to have men ready to take charge of the forests which may be taken under management. Until so required, these men will find ample work in the Singhbhoom reserves.

56. It will, at an early date, be necessary to bring the sub-divisional Forest Officers into a suitable official relationship with the Deputy Commissioners of the districts, or with the sub-divisional Civil Officers.

CHAPTER IV.

THE SINGHBHOOM RESERVES.

1.—Situation.

57. About midway between Chakardharpur and Chybassa, or about 20 miles from the southern edge of the Chota Nagpore plateau, a range of hills takes its rise with the Khondra Hill, which from this point runs generally in a south-western direction to the south-western boundary of the Singhbhoom District. The first part of this range is known as the Chakardharpur Hills, the next part as the Kolhan Hills, and the last as the Saranda Hills. The Chakardharpur Hills are only about six miles broad, but the series extends considerably towards the south-west, so that the Saranda Hills occupy a tract of country fully 20 miles broad. Although the general direction is from north-east to south-west, the several ranges run in various directions, forming a hilly tract intersected by numerous streams. On the north of the Chakardharpur Hills the Sanjai nuddy runs in an easterly direction, and, after joining the Korkai, flows into the Subarnrekha River; on the south-east the Koro nulla runs in a north-easterly direction and also joins the Korkai. The Kolhan Hills are drained by the Deo nuddy and the Karo, which join at Rairua, and then run on until they join the Koil river at Omko. The Saranda Hills have the Koil on the north-west and the Karo on the east. The principal feeders of the former are the Koina and the Sumtia.

2.—Areas.

58. In the territory thus described the following reserved forests have been constituted:—

		Estimated area, in square miles.
1	The Saitba Block	29
2	The Santara Block	72
3	„ Leda „	38
4	„ Latua „	70
5	„ Saranda Forest	312
	TOTAL	521

In addition to the above, the Porohat Forests, or an area of about 207 square miles, have been notified under Section 4 of the Indian Forest Act, and it is expected that they will be gazetted as reserves before the close of the present financial year. These proposed reserves are situated in the northern part of the Singhbhoom District, that is to say, along the southern edge of the Chota Nagpore plateau, and on a number of hill ranges which stretch southward from it until they meet the Leda Block at the Chybassa-gurjun road. This addition will bring the total area of reserved forests in the Singhbhoom District up to 728 square miles.

59. Numerous villages are found in these blocks; most of them have been demarcated out as enclosures, but a number of the smaller settlements have either been bought out or are about to be bought out. The following is an abstract of the demarcated enclosures :—

In the Saitba Block : Enclosure No. I.—Containing the villages of Chendea, Nachrai, Jambuia, Tirilpi or Tirilkuti.

Enclosure No. II.—Containing Redsud and Chitimiti.

Enclosure No. III.—Containing Jalda.

Enclosure No. IV.—Containing Roauli, Kurjuli, and Sano Bankan.

Enclosure No. V.—Containing Boro Bankan, and Petapeti.

In addition to the above, there are the villages of Rangamati and Janundiri, which it is proposed to buy out. It has lately been discovered that another village, Kapaia, exists, which it is also proposed to remove.

In the *Santara* Block only two permanent enclosures exist at present, No. I containing Sarjombura, and No. II, Gawsal and Luia. It is proposed to buy out the remaining villages, Baruchiria, Tumbahaka, Chatuda, Merelgara, Mailpi, Lemsadihi and Katamba.

In the *Leda* Block only two villages, Kendbai and Buru Sarbil, exist, which it is proposed to buy out. Two other villages, Patung and Rairua, are situated on the boundary, and they have therefore not been mentioned as enclosures.

In the *Latua* Block :—

I.—Borta, Sasangtondang, Kunopi.
II.—Pukria.
III.—Udalkam.
IV.—Masuribera.
V.—Kuilsutha.
VI.—Banki.

It is proposed to buy out the remaining villages of Tuinbera, Rutagutu, Pukuriburu, Rajabasa, Chandibinda and Jirjor.

In the *Saranda Range* 41 villages, grouped in 15 enclosures, have been demarcated out. They are as follows :—

I.—Bongarkel.
II.—Sodha, Thimira and Lo.
III.—Biua.
IV.—Chirnabera and Ankua.
V.—Henoa, Salai, Mahmer, Dodari and Dhuria.
VI.—Churgi, Lemra, Kumbia, Tamkuria, Dohbill, Honnagra, Bhadunia, Hatnabera, Sonapi, Hendaburu, Bohorda, Rajabera, Jojogutu, Baihatu, Bonaika and Tepturighat.

VII.—Petcha.
VIII.—Ponga and Holomuli.
IX.—Usaruia.
X.—Kulaiburu and Kodolibad.
XI.—Tonto.
XII.—Rolamatia.
XIII.—Tholokbad.
XIV.—Sonkojogoda.
XV.—Kurumpoda, Nuagaon and Bhandgaon.

The following villages are also mentioned in the Government Gazette Notification under Section 19 of the Forest Act:—

Ambia, Lohabera, Balia, Jambua, Jamira, Ruam, Gatkuri, Gangdha, Numia, Gua, Boraibura, Sosanga, and Tantipahar.

These 13 villages are all situated along the boundaries of the reserve, and they have therefore not been mentioned above as enclosures.

The enclosures in the *Porohat Block* will be very numerous, but as they have not yet been finally settled, no list can be given of them in this place.

3.—Forest Growth.

60. The forests may throughout be described as sâl forest. That tree is found almost everywhere, except perhaps on exceptionally dry hills. Bamboos are comparatively scarce. Generally, the composition of the forest is that given for sâl forest in the first chapter of this Report. The difference in the quality of the forests in the valleys and on the hills is very considerable. Generally, the best forests are found on the lower level ground, and the quality decreases on going up the hill slopes, so that two different classes of sâl forest must be distinguished.

First class sâl forest, which produces large timber fit for export, and

Second class sâl forest, which yields timber only fit for local consumption.

Roughly speaking, it may be estimated that the former class of forest occupies about one-third of the total area, and the latter class about two-thirds. It follows that the reserves will always produce enormous quantities of timber only fit for local consumption.

61. No definite information is at present available regarding the stock of mature timber available in these reserves. A general inspection has proved that a fair quantity of mature sâl trees is found in Saranda, Leda, Latua, and in certain parts of Santara and Porohat. Hardly any mature trees were found in Saitba.

4.—Proposed Management.

62. The Saitba block is so heavily burdened with privileges that its management must be regulated with reference to these. The remaining reserves will be free of rights and privileges, or, at the most, they will be so lightly burdened that they can be managed with reference to the export of timber.

Saitba Block.

63. Although no rights have been formally recorded at the forest settlement, it has been proposed by the Deputy Commissioner that the inhabitants of 247 villages surrounding this block, including Chybassa, shall be provided with forest produce from it as far as they cannot supply themselves from their own lands. The total area of the block is only 29 square miles, and it stands to reason that special measures must be taken to supply so large a number of people with forest produce, if the forest growth is not to disappear altogether.

64. The north-western portion of the block consists principally of a tolerably high range, while the south-eastern half is situated on an undulating high plateau with a steep descent towards the Chybassa plain. The plateau is covered with forest, of which sâl is the principal constituent, and this is also the case along the foot of the hills in the north-west, but the quantity of sâl becomes much smaller on ascending the hills; no sâl, or hardly any, is found on the south-western slope. The principal companions of the sâl are:—Asan, on the undulating ground and also to some extent on the hills; Dhauta, more especially on the hills; Sidha, Piar, and a fair amount of Mohwa; Salai is principally found on the hills and on the drier ground generally; the undergrowth consists principally of Pasu, Icha, Toa, Maisanda and Gardenias. Harra and Kusum are met with here and there, also Bahera. Bamboos have almost completely disappeared from the south-eastern half, but limited quantities are still found in the north-western half. Very few mature trees are now found in the block, which has been extensively worked for generations past.

65. The following plan of working will probably be found suitable. The block should be divided into a number of sections, to meet the requirements of the people in the different parts. Further enquiry will show the most suitable number of sections. It is understood that the privileged villages have been grouped into a number of *Pirs*, and it will probably be best to provide a section for each *Pir*. In some cases it may be practicable to throw two or more *Pirs* together. Each *Pir* or group of *Pirs* will remove material from one section only. It will not be necessary at present to enforce any restrictions as regards the removal of dry and fallen wood, and the ordinary minor produce, such as grass, palm leaves, Bauhinia bark, brushwood for fencing and such like purposes, roots and dye-stuffs. As regards green trees, it should be understood that, throughout the block, sâl is considered a reserved tree, as well as Harra, Kusum and Mohwa. None of these trees should be cut, except on a special license issued by the Forest Department. For the rest, each section should be divided into two compartments of equal productiveness; one compartment should be closed against the removal of all green standing trees, and the other opened. After a suitable number of years has elapsed, the closed compartments should be opened and the others closed; special arrangements will also have to be made to prevent the extirpation of bamboos.

It will probably not be necessary at present to enforce any restrictions as regards grazing; should it be found necessary to close certain areas hereafter, the subject may be reconsidered. On the other hand, it seems to be absolutely necessary to keep fires out of the entire block, otherwise the area will not nearly be sufficient to satisfy the demands made on it. The people must be made to understand that their co operation in this respect is absolutely necessary, and that any part of the block overrun by fires is liable to be closed at any time against the exercise of any privileges whatever. In this respect the people of each *Pir* or group of *Pirs* will primarily be held responsible for their own section.

66. The annual expenses of preserving the Saitba block may approximately be estimated as follows:—

	Rs.
Pay of Forester and of forest guards	600
Clearing 60 miles of boundary, and repairs to boundary pillars .	150
Fire protection	250
TOTAL .	1,000

In addition to the above, it will be necessary to construct a certain number of roads and buildings. It is but fair that these expenses should be made

good to the Forest Department, and, under these circumstances, sâl, throughout the block, should only be given on payment, at such rates as may be fixed from time to time. A small amount may hereafter also be realized by the sale of myrobalans and of lac, but no revenue can be expected from these sources at present. Under the most favourable circumstances the total revenue realized in this manner will, for a number of years to come, be only a fraction of the total expenditure, and the question arises how the balance shall be raised. It is for the local authorities to decide whether a small fee per privileged house should not be collected. As an instance, it may be mentioned that in the Khoordha forests of Orissa a house-rate of four annas per annum is collected. The difficulty in this respect is that only certain house-owners make use of the forest, while others supply themselves from their own land; and it would therefore be a better plan to issue annual licenses to all those who desire to make use of the forest. Such a license would only convey the right to remove produce as far as it is required for the holder's own use.

67. It is also for consideration whether so many as 247 villages shall be granted privileges. On a reference to the map, it appears that a large number of these are situated at a considerable distance from the Saitba block, while others have forests of their own. I am inclined to think that the list should be further scrutinized. Generally, it should be laid down that all privileged people, who remove produce for the purpose of selling it, should pay for what they remove, at such rates as may from time to time be fixed for non-privileged consumers. Unless some such rule is introduced, it will be exceedingly difficult, if not impossible, to preserve this forest, and, after all, what is being done is for the benefit of the surrounding population.

Santara, Leda, Latua, Saranda and Porohat Forests.

68. The area of these forests amounts to 699 square miles, or, in a round number, 700.

Survey of Boundaries.—The forests are all demarcated, and the first step must be to survey the external boundaries, as well as those of the enclosures. This should be done by the Forest Survey Branch, so that the work can be used in any detailed survey of the areas, if such should hereafter become necessary. For the present, the existing maps on the scale of 1 inch=1 mile give sufficient interior topographical details. If the necessary steps are taken at once, arrangements can be made by the Superintendent of Forest Surveys to commence the boundary-survey on the 1st November 1885.

69. *Working Plan.*—It has been stated that the forests naturally divide themselves into first and second class sâl forests. Arrangements should be made, as early as possible, to lay down the boundaries of the first class sâl forests on the 1-inch map, so as to ascertain their area. When this has been done, a working plan should be drawn up. As regards the second class sâl forest, this will consist of some simple provisions regulating the manner in which the produce of the forests shall be made available for local consumption. The yield of these forests is so much larger than the demand that the regulations may be of the most simple nature.

70. In the first class forests it will be necessary to attend to the following work:—

(1) An enumeration should be make of all sâl trees measuring 3′ in girth and upwards, measured at height of chest. It will probably suffice to have at present size-classes of 3 feet (or 2 cubits), that is to say—

3′ to 6′
6′ to 9′
9′ to 12′
and so on.

(2) The rate of growth must be ascertained. For this purpose sections of sâl trees should be examined. At present it is believed that the age of a sâl tree of three feet girth in first class forest is about 50 years, and that of a tree of six feet girth about one hundred years. Further investigation is, however, necessary. It is also desirable to mark off at once a sufficient number of trees in, say, three localities, and to measure these carefully. Probably measurements taken once in three years would be sufficient. The trees should be dominant and of all sizes, so as to obtain, within a short time, a scale showing the rate of growth.

(3) From the data described under the above two heads, the annual yield must be calculated. This may be done, at the outset, by dividing the number of trees of 6′ girth and upwards by the number of years which it will take to replace them. *Example:* As the number of trees from 3′ to 6′ girth is much larger than that above 6 feet, the number of years within which the trees of upwards of 6 feet girth may be removed is likely to be somewhere near 30. Supposing this to be so, one-thirtieth of all trees of 6′ and upwards could be removed annually. The whole area of first class forest should in that case be arranged in 30 groups of approximately equal richness in mature sâl trees (6′ girth and upwards), and the mature trees in one group removed each year. In case the Railway requires large quantities of sleepers, there will be no objection to anticipate the cuttings in, say, ten groups, provided that no cuttings are made in the first class sâl forests during the following ten years. On the whole, however, it would be better not to anticipate cuttings.

71. Judging by a general inspection, it may be assumed that out of the total area of 700 square miles, not less than 200 square miles will be found to contain first class sâl forest. It has also been estimated that the first class forest contains about one mature sâl tree per acre. Starting from these estimates, the forests could yield at once not less than 4,000 mature trees a year, and this yield would be largly increased as time goes on. Apart from the first class forest in the reserves, the second class forest will yield a limited quantity of sâl timber, fit for export, for a number of years, and large numbers of mature sâl trees had necessarily to be left outside the reserves. Besides, there is a considerable number of dry trees in many parts of the district, inside and outside the reserves. No estimate can at present be made of the quantity of timber thus available. Under any circumstances, the dry trees and the mature trees outside the reserves should be used first, more especially for the preparation of Railway sleepers.

On the whole, it may safely be assumed that the Singhbhoom Reserve will, apart from local consumption, at once yield steadily not less than 5,000 mature sâl trees a year for export.

Disposal of Sâl Trees.

72. The sâl trees available for export may be disposed of in various ways:—

(1) by selling them standing in the forests to contractors.

(2) By converting them into beams and other scantlings, and, if necessary, exporting them to Bengal.

(3) By sawing them into Railway sleepers.

It is impossible to say at present which method should be adopted. If reasonable prices can be obtained, the first method would specially commend itself, as it relieves the Forest Officers of the duty of converting and retailing the timber. Possibly, when the Bengal-Nagpore Railway, which passes through the reserves, has been opened, the adoption of the system may be possible. If the timber has to be worked out departmentally, it will be best to combine the second with the third method. Specially fine pieces should be sent to Bengal as squares to serve as beams, etc., and the rest should be cut up into Railway sleepers and other scantling. It is presumed the Bengal-Nagpore Railway will take the sleepers, and, if not, they can be sent to the East Indian Railway. The other scantling will have to be sent to Bengal. It is for future consideration whether a portable saw-mill, driven by water or steam power, should be used, or whether the work of sawing should be done by hand.

73. Whatever system may be adopted, it will be necessary to lay out and construct an extensive system of carting tracks, and it has been estimated that this will ultimately extend over some 600 miles. The main roads should follow the main valleys, and generally end at a railway station. It will be advisable to commence the construction of some of the main roads at an early date so as to be prepared for any sudden indent which may be received from the Railway Department. The branch roads leading up the side valleys can be constructed as required by the progress of the work. Regarding the supply of Railway sleepers, a separate Memorandum will be found in Appendix II of this Report.

Protection and Improvement of the Reserves.

74. The reserves and proposed reserves are divided into the following Ranges :—

	Area, in square miles.
The *Chybassa* Range, comprising the Saitba and Santara blocks	101
The *Kolhan* Range, comprising the Leda and Latua blocks	108
The *Saranda* Range	312
The *Porohat* Range	207
TOTAL	728

This will be sufficient for the present. Ultimately, it may be necessary to divide the Saranda and Porohat Forests into two ranges each. I noticed during my tour of inspection that the forests are well protected.

75. *Creepers* are numerous in many parts, and they should be systematically cut in the first class sâl forest, as soon as the more preliminary works are further advanced.

76. *Fire protection* should be attended to as soon as the marking has been commenced. All areas in which cuttings have been made should be strictly protected. *Planting operations* will not be required at present.

77. Special care should be taken to protect all *Kusum*, *Mohwa* and *Harra* trees, as these will yield lac, mohwa flowers and myrobalans, which will increase the revenue from the forests, and, to some extent, the food-supply of the country. Generally, all sources of minor produce should be fostered.

CHAPTER V.

FINANCIAL.

Apart from the charges of direction and general supervision, the financial results of the forest operations in Chota Nagpore, since their commencement in 1870, are as follows:—

Years.	Receipts.	Charges.	Deficit.
	Rs.	Rs.	Rs.
1870-71	96	8,461	8,365
1871-72	334	9,771	9,437
1872-73	86	6,892	6,806
1873-74	29	1,125	1,096
1874-75	...	1,790	1,790
1875-76	1,019	6,458	5,439
1876-77	1,254	7,197	5,943
1877-78	1,006	16,088	15,082
1878-79	757	17,327	16,570
1879-80	1,138	16,208	15,070
1880-81	4,025	8,135	4,110
1881-82	2,414	24,436	22,022
1882-83	6,675	39,052	32,377
1883-84	3,768	28,610	24,842
Total of 14 years	22,601	1,91,550	1,68,949
Average per year	1,614	13,682	12,068

It will be noticed that the Expenditure amounted to Rs. 1,91,550, while the total Receipts reached only Rs. 22,601, leaving a Deficit on the working of Rs. 1,68,949. Whatever may be thought of the operations of the Department, it cannot be said that it was influenced by mercenary considerations. It was recognised that the prevention of further forest destruction in these districts was an important and necessary measure, and the Department approached the task, well knowing that it involved heavy outlay, without any corresponding income for a considerable number of years to come. Now, railway communication is approaching the division, and it is expected that the Singhbhoom Reserves will enable the Department to recoup the past outlay. At the same time, it is proposed to invest a fresh sum of five lakhs of rupees in the acquisition of additional forest areas in those parts of the division where no Government lands are available. As already stated, such an investment is believed to be remunerative in the end, apart from the fact that the Singhbhoom Forests will, in the mean time, make good the interest on the money so invested, if not refund the capital itself.

Appendix I.

Forest Rules for Zamindari Forests reserved under the superintendence of the Forest Department.—[Promulgated by the Commissioner of Chota Nagpore.]

1. The following rules will apply to all tracts of forest land in Chota Nagpore taken under the management of the Forest Department, upon application made by the Zamindars under Section 38 of the Forest Act.

2. All applications shall be made to the Deputy Commissioner, or, in a sub-division, to the Assistant Commissioner in charge, and shall define roughly the boundaries of the separate forest blocks on the applicant's estate, which he desires to be managed by the Forest Department; and no general application, not specifying the position and boundaries of the blocks and giving the approximate area, will be accepted. No application shall, as a rule, be accepted for any tract covering an area of less than a square mile.

3. When an application is accepted, the District Forest Officer will be requested to visit the tract and to report whether it is one which is worth taking up. He will also enquire whether, if this tract be taken up under these rules, there will be enough jungle left to provide for the wants of the ryots under Rule 8, and till the receipt of the Forest Officer's report no further steps shall be taken.

4. When an application is finally approved of on the Forest Officer's report, a notification similar to that prescribed in Section VI of the Indian Forest Act shall be published. If, within three months of the publication of this notice, the title of the petitioner to the unreserved use of the tract proposed by him to be taken under forest management is impugned, the petitioner will be required to apply that such claims be adjudicated under the provisions of Chapter II of the Indian Forest Act.

5. When all enquiries have been completed, and it is settled that the forest is one of which the management should be accepted, the forest must be demarcated by the Forest Officer in consultation with the owner. The owner of the forest will arrange for the supply of the necessary labourers.

6. In guarding the forest, the following general rules will be observed. In forests covering a large area, not less than 20 square miles shall be placed under each chowkidar, but in smaller forests surrounded by cultivated villages, where more effectual watching is required, it may be necessary to give each man a smaller area to look after. The Forest Officer shall decide in such cases what number of men is necessary.

7. The duty of the chowkidars appointed under the instructions of the Forest Department will be simply to guard the trees of the forest and the forest products from being injured or made away with by intruders. If, in any forest under protection, the Zamindar wishes to dispose of the forest products, or to cut down and sell trees reported to be fit for cutting, he will appoint separate men to watch the persons allowed to enter the forests for the purpose of taking away the trees or produce disposed of.

8. In no forests under the superintendence of the Forest Department will villagers be allowed to cut wood, bamboos, or grass, or to graze their cattle. In determining the forests to be taken under superintendence, it will be necessary to see that there are still left jungles amply sufficient to supply the wants of the villagers of the estate or tenure in firewood, rollers and beams for their houses; bamboos and grass; and also ample space must be left for cattle grazing, but it will not be necessary that these village forests should supply timber of more than one cubit in girth. If villagers want larger timber than these jungles will supply for making sugar-mills or other purposes, they must apply to the Zamindar and get permission to take timber of the required size from the forests under the Forest Department, and this timber will be given them free of cost, on the production of the written order of the Zamindar.

9. No sal, pya sal, kend, sissoo, rohni, kurrum, kusum, kohua, gumbar, sidha, or asan trees, of which the circumference is less than three cubits, shall be allowed to be cut in the jungles under the Forest Department, and no trees whatsoever shall be cut until marked by the Forest Officer, who will inspect them on receipt of information from the owner that he wants to sell the trees. No hurra, bahera, or mohwa trees will be allowed to be cut in these forests, but the produce may be gathered by persons appointed for the purpose by the Zamindar.

10. All forest chowkidars will be paid by the Forest Department. Each owner will pay in advance into the treasury, on dates to be fixed by the Deputy Commissioner, the pay of the chowkidars appointed to watch his forests. The money will be credited to the forest revenue, and the Forest Officer will draw cheques for the amount, the treasury officer supplying monthly statements of the revenue paid in.

11. The following acts are prohibited in forests taken under the Forest Department, unless previous permission be given by the Forest Officer :—

(*a*) Felling, girdling, tapping or burning, or otherwise damaging any tree reserved in Rule 9.

(*b*) Quarrying stone, burning timber or charcoal, or collecting or removing any forest produce.

(*c*) Clearing land for cultivation, for building, for herding cattle, or for any other purpose.

(*d*) Setting fire to such forests, or kindling a fire without taking reasonable precautions to prevent its spreading into such forests.

(*e*) Leaving any fire kindled in the vicinity of such forests still burning.

(*f*) Grazing cattle within such forests.

12. No persons entering and remaining in or passing through the forests for the purpose of collecting forest produce, or for felling timber, or for any other purpose, shall cook their food, or camp, except in places specially set apart for the purpose by the Forest Officer, and no fire shall be lighted by any one except in such places.

13. All villagers living near the forest boundaries will be required to assist in putting out fires.

14. The Zamindar shall receive from the purchaser direct the whole of the price of timber felled in, or forest produce taken from, forests on their property to which these rules apply. The only expenses that will fall upon the owners of the forests will be the cost of the demarcation of boundaries, clearing for fire protection and camping grounds, the pay of the chowkidars, and the cost of collecting forest produce and of cutting timber not paid by the purchaser; and no work, except clearance of boundaries and camps and demarcation, shall be undertaken without the special permission of the Zamindar.

Appendix II.

Memorandum on the supply of Sleepers to the Nagpore-Bengal Railway,—by W. SCHLICH, *Inspector General of Forests to the Government of India.*

1. The Forest Department manages at present the following areas of reserved forests and proposed reserves under settlement :—

	Square miles.
(i) The Saranda Reserves	312
(ii) The Kolhan	209
(iii) The Porohat Proposed Reserves	207
TOTAL	728

These forests are situated in the western half of the Singhbhoom District, or west of Chakardharpur, a proposed changing station on the new line of Railway. In the eastern half of Singhbhoom are several private estates which contain sâl forest, but no details are available regarding these forests. Extensive sâl forests exist along the southern edge of the Lohardugga district. In the east are the Tamar sâl forests, and in the west those of Basia, Belsian, and Biru. All these forests are the property of Zamindars, but many of them have been leased to timber traders. I have estimated that about one lakh of broad-gauge sâl sleepers have been cut during the last five years in the Tamar forests, and taken to various points of the East Indian Railway. They are able to yield about another lakh of sleepers. From the Basia and the Belsian forests smaller quantities of sleepers have been exported.

I have no reliable information regarding Manbhoom.

2. At the western end of Singhbhoom is the estate of Anandapur, which still contains some fine sâl forest, especially in the vicinity of Derua, which the new line passes.

Next to Anandapur comes the Native State of Gangpur. The eastern part of this State is said to contain little mature timber now, but well stocked forests still exist in the west. The hills along the boundary between Jashpur and Udaipur, and the northern part of Jashpur contain also good forests.

The State of Bonai, situated to the south of Gangpur, and of Saranda, is said to contain magnificent sâl forests, but the timber is difficult to extract, except from the northern part of the State.

3. The Government forests, including some unreserved areas, can furnish a maximum of five lakhs of broad-gauge sleepers, if so many are required. The Tamar forests will yield about one lakh. I do not think the Basia, Belsian, and Biru forests will furnish more than one lakh. This makes a total of about seven lakhs from forests in British territory. What quantity the Native States can furnish I am not in a position to state.

4. Now as regards the *price*. Various estimates have been made, ranging from Re. 1 to Rs. 5-14 per sleeper. The actual cost will probably be from Rs. 3-8 to Rs. 4-8 delivered on the line. Mr. Parker's estimate of Re. 1 per sleeper is quite out of the question. He might be able to secure a few hundreds at that rate, which can be cut on the strip of land over which the railway passes, but, beyond that number, heavy expenses will have to be incurred. I cannot say what sleepers derived from private estates will cost, but I have fully gone into the question as regards the Government forests. The latter comprise an area of about 800 square miles (including unreserved forests), and these are distributed over an area of some 2,000 square miles. The stock of mature timber in the forests is not large, and the material fit for sleepers is not found in one or a few special blocks, but is scattered over the 800 square miles. This area consists of an uninterrupted net-work of hill ranges and narrow valleys, and I estimate that, in order to supply sleepers on a large scale, the Forest Department will have to lay out and construct about 600 miles of carting tracks. Although these roads will be constructed as cheaply as possible, still it must be remembered that they are all to be made in hilly country, and that they will consequently cost a good deal of money.

5. Skilled labour in sufficient quantity is not available in Singhbhoom, and large numbers of sawyers will have to be imported. I found that now already sawyers, most of whom had come from other districts, are paid 10 annas for the mere squaring of a broad-gauge sleeper. As soon as the operations are extended, and more so as soon as the works on the line are commenced, rates are sure to rise very considerably.

6. Carting also is not cheap at present, and the rate of this charge is likely to rise. The line of Railway will pass for only two miles through reserved forest, and as it generally traverses the better populated valleys, it follows that the bulk of our forests is situated at some distance from the line. Unfortunately, many hill ranges run parallel with the line, so that additional carting is required.

7. Taking all these points into consideration, I have arrived at the following conclusion:—

If the Forest Department is permitted to deliver the sleepers at any convenient spot on the line between Chakardharpur and Bisra (both stations on the line), it can furnish good serviceable sâl sleepers of the broad-gauge size at—

	Rs.	A.	P.	
(i) For the first lakh	3	8	0	each.
(ii) For second and third lakhs	4	0	0	„
(iii) For fourth and fifth lakhs	4	8	0	„

The expenditure is higher for the second to the fifth lakhs, because more roads will have to be constructed and the lead is longer.

8. The above are the rates which I consider fair, but the Bengal Government is not bound to accept them, though the Conservator of Forests in Bengal has expressed to me his readiness to provide sleepers at these rates. It should, however, be particularly understood that the Forest Department is by no means eager to deliver large quantities of sleepers. The Department would be glad to receive an early order for one lakh, but beyond that it would prefer to give only what cannot be obtained from private forests. Sleeper operations conducted in a hurry are not conducive to good forest management, and the Department cannot afford to sacrifice forests, regarding which it has had a good deal of trouble and expense in past years, for the sake of providing sleepers to the State Railway, at a rate, perhaps, a few annas below that at which they can be obtained elsewhere.

9. If the Railway Department desire to have sleepers from the Government forests, indents should be sent to the Government of Bengal, or to the Conservator of Forests of that province.

Appendix III.

List of Trees and Shrubs found in Chota Nagpore; compiled from Gamble's "Manual of Indian Timbers," with some additions by F. B. Manson, Deputy Conservator of Forests, Chota Nagpore Division.

[Appended for ready reference.]

No.	Natural Order.	Systematic Name.	Kól Name.	Remarks.
1	Ranunculaceæ	Clematis Buchananiana, *DC.*	....	Found on Parasnath hill.
2	Dilleniaceæ	Dillenia pentagyna, *Roxb.*	Korkotta, Rai	Met with in South Lohardugga and Singhbhoom. Stunted on the dry hills, but growing well in first class sâl forest. The fruit is eaten.
3	Anonaceæ	Polyalthia suberosa, *Roxb.*	Sandi omé	Found in Singhbhoom.
4	Do.	Anona squamosa, *Linn.*	....	Found near villages in Hazaribagh.
5	Do.	Saccopetalum tomentosum, *Hook. f. & Th.*	Omé, Hake humá	Common in Singhbhoom Forests.
6	Berberideæ	Berberis asiatica, *Roxb.*	....	Found on Parasnath hill.
7	Capparideæ	Capparis horrida, *Linn.*	Gaterna	
8	Bixineæ	Cochlospermum Gossypium, *DC.*	Hupu	Found on dry hills, not used.
9	Do.	Flacourtia Ramontchi, *L'Herit.*	Gerali, Merlo, Sarlarkha	Found in second class sâl forest. The fruit is eaten and also the leaves, which are boiled as a vegetable.
10	Tamariscineæ	Tamarix ericoides, *Rottl.*	....	Found in beds of rivers in Palamow.
11	Dipterocarpeæ	Shorea robusta, *Gærtn.*	Sarjom, sekwa	Found throughout Chota Nagpore. The seeds are eaten in times of scarcity, after repeated boiling. The wood is universally used. Resin is collected; also tassar.
12	Malvaceæ	Kydia calycina, *Roxb.*	Bitha gonyer	Found generally near streams in first class sâl forest, and also in second class forest. The bark is sometimes used for ropes.
13	Do.	Bombax malabaricum, *DC.*	Dél, Edel	This tree is found scattered over Chota Nagpore, but is not very plentiful. The cotton is collected for sale. The root and gum are used medicinally.
14	Sterculiaceæ	Sterculia urens, *Roxb.*	Teley	Very common on dry rocky soil. The fibre is used for making ropes, and for the bags or coils in which certain oil-seeds are crushed.
15	Do.	Sterculia villosa, *Roxb.*	Sisi, Walkom, Pironja	Fibre used for making ropes, but the tree is not so common as the preceding.
16	Do.	Sterculia colorata, *Roxb.*	Sisi	Scarce.
17	Do.	Helicteres Isora, *Linn.*	Renta, Sakomsing, Marang bursu.	Common in Singhbhoom Forests. Used as rope fibre.
18	Do.	Eriolæna Hookeriana, *W. & A.*	Bándún, Oitbulung, Bándún, Ponra.	Found in Palamow.
19	Tiliaceæ	Grewia tiliæfolia, *Vahl.*	Goior, Dhamon	Common. The wood is valued for banghy poles. The bark is used for cordage.
20	Do.	Grewia salvifolia, *Heyne*	Sita bheli	Found in Palamow and in Singhbhoom.
21	Do.	Grewia polygama, *Roxb.*	Bursu	The bark is used for cordage.
22	Rutaceæ	Murraya exotica, *Linn.*	....	Found in Singhbhoom.
23	Do.	Ægle Marmelos, *Correa*	Lohagasi, Sinju	Not uncommon in Singhbhoom Forests. The fruit is eaten.
24	Simarubeæ	Ailanthus excelsa, *DC.*	Pirinim, Ghorkaram	Found in Palamow.
25	Burseraceæ	Boswellia thurifera, *Colebr.*	Salga, Salai	Very common in dry forests. The wood is said to be used by the Kóls for cremating purposes. Branches are also used as fencing posts and "machan" posts, as they strike root readily.
26	Do.	Garuga pinnata, *Roxb.*	Nia jowa	Found in South Lohardugga and Singhbhoom in second class sâl forests.

List of Trees and Shrubs found in Chota Nagpore, &c.—continued.

No.	Natural Order.	Systematic Name.	Kôl Name.	Remarks.
27	Meliaceæ	Melia Azadirachta, *Linn.*	Nim	Found near villages. The flowers and young shoots are used medicinally.
28	Do.	Melia Azedarach, *Linn.*	Gara nim, Mulinga	Scarce, and generally on abandoned village lands.
29	Do.	Amoora Rohituka, *W. & A.*	Sikru	Occasionally found in first class sâl forest in shady valleys in Singhbhoom.
30	Do.	Heynea trijuga, *Roxb.*	... ...	Found in Singhbhoom.
31	Do.	Chloroxylon Swietenia, *DC.*	Sengel, Sali	Found in Palamow Forests. The wood is used for agricultural implements.
32	Do.	Cedrela Toona, *Roxb.*	Katangai, Katangari, Tund.	Scarce, but found in shady ravines in Singhbhoom Forests. The flowers are said to be used for dyeing.
33	Olacineæ	Olax scandens, *Roxb.*	Rimmel	A creeper, found mostly in first class sâl forest. The fruit is used in Hazaribagh for making "sherbet."
34	Celastrineæ	Celastrus paniculatus, *Willd.*	Kujuri, Kujri	A creeper found in Palamow and in Singhbhoom. An oil is obtained from the seeds and used for lubrication.
35	Do.	Elæodendron Roxburghii, *W & A.*	Miri	Found in Singhbhoom Forests.
36	Rhamneæ	Zizyphus Jujuba, *Lam.*	Janumjâm, janumjarom	Commonly found near villages and in old cultivation. Valued for its fruit. The wood is sometimes used for furniture, rice-pounders and agricultural implements.
37	Do.	Zizyphus Œnoplia, *Mill.*	... ...	Found in the Damoodur Valley; used for fencing.
38	Do.	Zizyphus xylopyra, *Willd*	Karkata	Common. Used for fencing.
39	Do.	Zizyphus rugosa, *Lam.*	Tshirka	Common. Used for fencing. The fruit is eaten.
40	Do.	Ventilago calyculata, *Tul.*	Bonga sarjum, Doesarai, Naduaor.	Found in the Saranda and Kolhan Forests. The bark is used for rope-making. An oil, used for cooking, is obtained from the seed.
41	Ampelideæ	Leea alata, *Edgew.*	... ..	Occasionally found in first class sâl forest.
42	Sapindaceæ	Schleichera trijuga, *Willd.*	Baru, Pusra	Found scattered about the forests. It is preserved by villagers for the propagation of lac. Oil is obtained from the seeds.
43	Anacardiaceæ	Mangifera indica, *Linn.*	Uli	Common in moist valleys in first class sâl forest, and commonly planted in groves near villages and on road sides for the sake of its fruit and for shade.
44	Do.	Buchanania latifolia, *Roxb.*	Tarum, Taro, Piar	Common in second class sâl forest. The fruit Taro-jo is eaten ripe and uncooked. The wood is not much used.
45	Do.	Odina Wodier, *Roxb.*	Dowka. Dhoka	Not uncommon in dry forest.
46	Do.	Semecarpus Anacardium, *Linn f.*	Soso	Common throughout Chota Nagpore. The orange-coloured portion of the fruit is eaten.
47	Do.	Spondias mangifera, *Pers.*	Amburu	Common; mostly in second class sâl forest. The fruit is eaten, and a preparation made with the bark and lime is said to be used as a medicine. Wood useless.
48	Moringeæ	Moringa pterygosperma, *Gaertn.*	Mulgia	Not common.
49	Leguminosæ	Indigofera pulchella, *Roxb.*	Uterr, Hutar	Common in Singhbhoom, and is also found in Palamow. The flowers Hutar-bo are collected for food and are sometimes sold in the bazar.
50	Do.	Millettia auriculata, *Baker.*	Hél	Common in first class sâl forest; not used.
51	Do.	Ougeinia dalbergioides, *Benth.*	Ruta	Common in dry forest; is used for house posts and agricultural implements.
52	Do.	Desmodium pulchellum, *Benth.*	....	Found in Lohardugga.

List of Trees and Shrubs found in Chota Nagpore, &c.—continued.

No.	Natural Order.	Systematic Name	Kól Name.	Remarks.
53	Leguminosæ	Erythrina indica, *Lam.*	Birsing.	Found occasionally in fences in Lohardugga.
54	Do.	Spatholobus Roxburghii, *Bth.*	Moru, Múrrd	Common in first class sâl forest. The stems are used as coarse ropes for occasional work, such as hauling the large memorial stones put up by the Kóls.
55	Do.	Butea frondosa, *Roxb.*	Murut, murup	Common in waste lands, where it is generally reserved for the propagation of lac.
56	Do.	Flemingia Chappar, *Ham*	Ulu	A common shrub of forest undergrowth.
57	Do.	Flemingia strobilifera, *R. Br.*	Ulu	Ditto.
58	Do.	Dalbergia latifolia, *Roxb.*	Rute, Kiri, Siso	Scarce.
59	Do.	Dalbergia lanceolaria, *Linn.*	Piri	Scarce. Met with in Saranda Forests.
60	Do.	Dalbergia paniculata, *Roxb.*	Pandri	Found in Saranda Forests.
61	Do.	Dalbergia stipulacea, *Roxb.*	———	A climbing shrub occasionally met with in first class sâl forest.
62	Do.	Pterocarpus Marsupium, *Roxb*	Híd, Hitun, Paisar	Is found scattered in the hill forests. The timber is extensively used for furniture, cart-wheels, building and agricultural implements. Gum kino does not appear to be collected.
63	Do	Pongamia glabra, *Vent.*	Koroinja	Commonly planted in Lohardugga and Singhbhoom. An excellent medicinal oil is obtained from the seeds; it is used for burning, and anointing the body.
64	Do.	Cæsalpinia sepiaria, *Roxb.*	Uchay	Found in Saranda forests.
65	Do.	Cassia Fistula, *Linn.*	Hari	Is found scattered in most of the forests. The wood is used for house posts and fencing and for agricultural implements.
66	Do.	Bauhinia Vahlii, *W. & A*	Lamma, Rúng, Rúm rurung, Mohnar.	This creeper is found all over Chota Nagpore. It is chiefly valuable for its fibre "chop," which is extensively used. The seeds are roasted and eaten and yield an oil. The leaves are used as plates and wrappers, and are made into waterproofs and hats for the rainy season.
67	Do.	Bauhinia malabarica, *Roxb.*	Laba	The leaves are eaten as a *ság*. It is not very common.
68	Do	Bauhinia racemosa, *Lam.*	Kaimu, Ghatonli	Common in second class sâl forest.
69	Do.	Bauhinia purpurea, *Linn.*	Buruju	Common near villages, and generally pollarded for fodder.
70	Do.	Bauhinia variegata, *Linn.*	Singya	Commonly found near villages. The leaves are boiled and eaten as a vegetable.
71	Do.	Bauhinia retusa, *Ham.*	Laba, Tewar	Generally in moist valleys; not very common.
72	Do.	Tamarindus indica, *Linn.*	Jojo, Tetar	Common in villages, especially in Singhbhoom, where it is also found in the forests. It is planted chiefly for its fruit. The wood is sometimes used for oil-mills.
73	Do.	Hardwickia binata, *Roxb.*	Anjan	Found in Palamow in dry situations; generally on sandstone.
74	Do.	Mimosa rubicaulis, *Linn.*	Dandu deta	A thorny shrub generally found in second class sâl forest.
75	Do.	Acacia arabica, *Willd.*	Bangur	Occasionally found in Porohat Forests and in Lohardugga; probably planted.
76	Do.	Acacia Catechu, *Willd.*	Khair	Found in Palamow and Hazaribagh. The trees are generally small; the wood is used for the manufacture of cutch; and the branches are used for fencing.
77	Do.	Acacia Intsia, *Willd.*	Kundaru	Found in Singhbhoom.
78	Do.	Acacia pennata, *Willd.*	Kundaru	Ditto.
79	Do.	Albizzia procera, *Benth.*	Pandrai	Met with in Singhbhoom Forests.

List of Trees and Shrubs found in Chota Nagpore, &c.—continued.

No	Natural Order.	Systematic Name.	Kól Name.	Remarks.
80	Leguminosæ	Albizzia stipulata, *Boivin*	Chapún, Kera serum	Frequent in moist situations; not used
81	Rhizophoreæ	Carallia integerrima, *DC.*	Júr	Found in Saranda Forests; does not seem to be used.
82	Combretaceæ	Combretum decandrum, *Roxb.*	Palandu, Koldungi	A common creeper, mostly found on good soil.
83	Do.	Terminalia bellerica, *Roxb.*	Lupúng, Lihúng	Common. The wood is used for solid cart-wheels. The kernels of the fruit are eaten.
84	Do.	Terminalia Chebula, *Retz*	Rola, Hadra	Is found scattered in most of the forests of Chota Nagpore. The fruit is exported from Giridi, but appears only to be collected locally. In Singhbhoom little is collected.
85	Do.	Terminalia tomentosa, *W & A.*	Hatana	One of the commonest trees of Chota Nagpore. It is principally used for rearing silk-worms, and for this purpose the tree is pollarded. The wood is used for solid cart-wheels, beams, posts, &c.
86	Do.	Terminalia Arjuna, *Beddome*	Gara hatana	Common on river banks. The wood is used for solid cart-wheels.
87	Do.	Anogeissus latifolia, *Wall.*	Hesel	A very common tree, of straight growth. The wood is valued for cart axles, building, and firewood.
88	Do.	Anogeissus acuminata, *Wall.*	Gara hesel, Pandri, Pansi	Scarce.
89	Myrtaceæ	Eugenia operculata, *Roxb.*	Topa	Occasionally found in first class sâl forest. The fruit is eaten.
90	Do.	Eugenia obovata, *Wall.*	Topa	Ditto ditto.
91	Do.	Eugenia Jambolana, *Lam.*	Kuda, Jambún	Common everywhere. In good soil it grows to a large size. The wood is used for agricultural implements, solid cart-wheels, and for buildings.
92	Do.	Eugenia Heyneana, *Wall.*	Gara Kuda	Found in beds of streams. Common in Singhbhoom.
93	Do.	Barringtonia acutangula, *Gaertn*	Saparung	Found in the Saranda Forests.
94	Do.	Careya arborea, *Roxb.*	Asunda	Occasionally met with. A coarse cordage is made from the inner bark.
95	Lythraceæ	Woodfordia floribunda, *Salisb.*	Icha, Dhawe	Very common in dry forests. It is coppiced in Singhbhoom for fencing. The flowers are exported from Giridi, where fresh flowers are sold @ 1 anna for 10 seers. They are dried and sent up-country, where they are used for dyeing.
96	Do.	Lagerstrœmia parviflora, *Hooker.*	Saikre	Found generally in second class sâl forest, but not of large size. The wood is sometimes used for agricultural implements, house posts, rafters, &c.
97	Do.	Lagerstrœmia Reginæ, *Roxb.*	Gara saikre	Found in Saranda Forests.
98	Samydaceæ	Casearia tomentosa, *Roxb.*	Roré	Common. The fruit is used as a fish poison.
99	Do.	Casearia graveolens, *Dalzell.*	Reri	Ditto ditto.
100	Araliaceæ	Heteropanax fragrans, *Seem.*	Arengi banu	The Eri silk-worm is said to feed on the leaves of this tree.
101	Do.	Heptapleurum venulosum, *Seem.*	Sukri rum	Found at Neturhât in Palamow.
102	Cornaceæ	Alangium Lamarckii, *Thwaites*	Ankol	Found in Singhbhoom Forests. The wood is good, and is used for making spinning wheels and similar small articles.
103	Rubiaceæ	Anthocephalus Cadamba, *Bth.*	Sanko	Occasionally met with in Singhbhoom Forests.
104	Do.	Adina cordifolia, *Hk. f. & Bth.*	Kúrumba, Kómba	Common. The wood is used for furniture.
105	Do.	Stephegyne parvifolia, *Hk. f. & Bth.*	Gúi-kômba, Gúi	Ditto ditto.
106	Do.	Hymenodictyon excelsum, *Wall.*	Sali	
107	Do	Wendlandia tinctoria, *DC.*	Tilai	Common in second class sâl forest; is reputed useless.

List of Trees and Shrubs found in Chota Nagpore, &c.—continued.

No	Natural Order.	Systematic Name.	Kól Name.	Remarks.
108	Rúbiaceæ	Randia uliginosa, *DC.*	Kúmkúm	Occasionally met with in first class sál forest. The fruit is said to be eaten.
109	Do.	Randia dumetorum, *Lam.*	Poto, Portoho	Common in first class sál forests. The wood is not commonly used; the branches are sometimes cut for fencing. The fruit is used as a fish poison.
110	Do.	Randia tetrasperma, *Bth. & Hk. f.*	Kota	Found in Lohardugga.
111	Do.	Gardènia turgida, *Roxb.*	Durdurl, Duri, Kharhar	Common in dry forest.
112	Do.	Gardenia gummifera, *Linn.*	Púrui, bururi	Common in Singhbhoom in second class sál forest. The fruit is eaten.
113	Do.	Gardenia latifolia, *Aiton*	Papra, Papadar, Papar	Common. The wood is used for making combs. The fruit is eaten, uncooked, when ripe.
114	Do.	Plectronia didyma, *Bth. & Hk. f.*	Jór	Found in Saranda.
115	Do.	Ixora parviflora, *Vahl.*	Pété	Found in Sarandá.
116	Do.	Pavetta tomentosa, *Smith.*	Sikriba, Sikéráp	
117	Do.	Morinda exserta, *Roxb.*	Chaili	Scarce; it does not seem to be used locally as a dye-stuff.
118	Do.	Hamiltonia suaveolens, *Roxb.*	Khdia	Found in Lohardugga.
119	Sapotaceæ	Bassia latifolia, *Roxb.*	Mandukum, Madkom	Common everywhere. Flowers used in large quantities for food and distillation of spirits. Oil extracted from the seeds. The wood is valued for ploughs, oil-mills, and all purposes for which a hard tough wood is needed.
120	Ebenaceæ	Diospyros melanoxylon, *Roxb.*	Tiril	Common everywhere. The wood is used for agricultural implements, rice pounders (pestles), &c. As a firewood it crackles and emits sparks, so that it is dangerous to use it in houses. The fruit is eaten.
121	Do.	Diospyros Embryopteris, *Pers.*	Gara tiril	Found in Singhbhoom Forests, of large size, on river banks.
122	Styraceæ	Symplocos racemosa, *Roxb.*	Ludam, Lodh	Common. The bark is collected in Hazaribagh District and exported from Giridi.
123	Oleaceæ	Nyctanthes Arbor-tristis, *Linn.*	Sapatúng, Kokra	Common in dry forest.
124	Do.	Jasminum Sambac, *Aiton.*	Mallika	Met with in Saranda Forests and in a grove near Belsian. It is mostly cultivated.
125	Do.	Schrebera swietenioides, *Roxb.*	Jarjo, Sandapsing, Ghato	Found in Palamow. The wood is of good quality and is used for making combs.
126	Do.	Linociera dichotomo, *DC.*	Deorkuda	Found in Singbhoom Forests.
127	Apocynaceæ	Carissa diffusa, *Roxb.*	Karonda, Kanuwán	A common thorny shrub used as fodder for goats, and for fencing.
128	Do.	Alstonia Scholaris, *R. Brown*	Chatin, Bomudu	Scarce.
129	Do.	Holarrhena antidysenterica, *Wall.*	Towa, Kuti, Korkoria	Common everywhere. The bark of the roots, pounded and infused, is taken as a febrifuge.
130	Do.	Wrightia tomentosa, *Rom. & Sch.*	Sandikuya	Occasionally met with, generally near streams.
131	Do.	Ichnocarpus frutescens, *R. Brown*	....	Found in Palamow.
132	Do.	Thevetia neriifolia, *Juss.*	....	Found in Singhbhoom at Chybassa.
133	Asclepiadeæ	Calotropis gigantea, *R. Brown.*	Palati	Found in Palamow; does not appear to be used for its fibre.
134	Borragineæ	Rhabdia viminea, *Dalzell.*	....	Found in Saranda.
135	Do.	Cordia Myxa, *Linn.*	Embrúm	Occasionally met with.
136	Do.	Cordia Macleodii, *Hk. f. & Th.*	Renta, Porponda	Ditto ditto.
137	Convolvulaceæ	Erycibe paniculata, *Roxb.*	Urumin	Found in Singhbhoom.
138	Bignoniaceæ	Oroxylum indicum, *Bth.*	Arengi banu, Sona, Sonepatta.	Found throughout Chota Nagpore, generally near streams. Wood useless.

List of Trees and Shrubs found in Chota Nagpore, &c.—continued.

No.	Natural Order.	Systematic Name.	Kol Name.	Remarks.
139	Bignoniaceæ	Stereospermum chelonoides, *DC.*	Kandior, Pandair	Scarce.
140	Do.	Stereospermum suaveolens, *DC.*	Kandior, Pandri	Common in Singhbhoom; not used.
141	Verbenaceæ	Callicarpa arborea, *Roxb.*	Búndún	Found generally near streams; not very common; not used.
142	Do.	Premna tomentosa, *Willd.*	Kotokoi	Scarce; not used.
143	Do.	Gmelina arborea, *Roxb.*	Kasamar	Not uncommon; grows best in moist vallers The wood is valued for making drums, cattle bells, and wooden utensils.
144	Do.	Vitex Negundo, *Linn.*	Ehúri, Sindwar, Hohoro	Common throughout Chota Nagpore, especially on the plateaux, but seldom seen in the forests. It is used for fencing, and occasionally as firewood.
145	Do.	Vitex altissima, *Linn.*	Simyanga, Gua	Met with on the Parasnath Hill.
146	Do.	Clerodendron infortunatum, *Linn.*	Kula marsal	Common under trees near villages; less frequent in the forests; not used.
147	Lauraceæ	Tetranthera monopetala, *Roxb.*	Pojo, Hajam	
148	Loranthaceæ	Loranthus longiflorus *Desr.*	Banda	Epiphytic, generally on the sál tree in Chota Nagpore, but also on other trees and shrubs.
149	Do.	Loranthus pulverulentus, *Wall*	Banda	Epiphytic. Found at Parasnath.
150	Urticaceæ	Strebulus asper, *Lour.*	Hara saijung.	
151	Do.	Artocarpus integrifolia, *Linn.*	Porós	Commonly planted; the fruit is used for food, and bird-lime is made from the milky juice of the tree.
152	Do.	Artocarpus Lakoocha, *Roxb.*	Dao	Occasionally met with. The ripe fruit is eaten.
153	Do.	Ficus Wightiana, *Wall,*	Amat-pipar	Scarce. The ripe fruit is sometimes eaten.
154	Do.	Ficus bengalensis, *Linn.*	Bai	Common everywhere; often found in groves. The ripe fruit is eaten occasionally, and branches are lopped for fodder.
155	Do.	Ficus infectoria, *Willd.*	Baswesa	Rather common.
156	Do.	Ficus religiosa, *Linn.*	Hesar	Common everywhere. Used as fodder.
157	Do.	Ficus cordifolia, *Roxb.*	Suman-pipar, Ganjar	Found in Lohardugga. Epiphytic.
158	Do.	Ficus retusa, *Linn.*	Butisa	Scarce.
159	Do.	Ficus Cunia, *Buch*	Ain, Riu, Podha porodumer.	Common. The ripe fruit is eaten.
160	Do.	Ficus glomerata, *Roxb.*	Lóa	Common. The ripe fruit is eaten generally uncooked.
161	Do.	Ficus Roxburghii, *Wall.*	Kotang	The fruit is eaten.
162	Do.	Ficus hispida, *Linn.*	Kotang, Sosokera	Scarce.
163	Do.	Sponia orientalis, *Planch.*	Rarunga, Kagsi	Found in Singhbhoom and on Parasnath; not used.
164	Euphorbiaceæ	Breynia rhamnoides, *Mull. Arg.*	Hara sejum, Sikat	Found in Palamow.
165	Do.	Antidesma Ghæsembilla, *Gaertn.*	Mata suré	Rather common in Lohardugga and Singhbhoom. The leaves are eaten as a "sag."
166	Do.	Antidesma diandrum, *Tulasne.*	Mata ara, Ooriya mata	Ditto. The fruit is also eaten.
167	Do.	Phyllanthus Emblica, *Linn.*	Meral	Common in dry localities. The leaves are said to be used as a remedy for dysentery, and the wood is sometimes used for agricultural implements.
168	Do.	Phyllanthus lanceolarius, *Mull. Arg.*	Marang mata	Found in Singhbhoom or river banks.
169	Do.	Briedelia retusa, *Spreng.*	Kharaka, Kaka	Generally found near streams. The wood is not specially valued, but is sometimes used for agricultural implements.
170	Do.	Briedelia torrentosa, *Blume.*	.....	Met with in Singhbhoom; not used.

List of Trees and Shrubs found in Chota Nagpore, &c.—concluded.

No.	Natural Order.	Systematic Name	Kól Name.	Remarks.
171	Euphorbiaceæ .	Lebediropsis orbicularis, *Mull. Arg.*	Parasu, Pás, Pasu . .	Common in Singhbhoom and south of Lohardugga. It is coppiced and the shoots used for fencing. The wood is also used as firewood. The bark is used as a fish poison.
172	Do. . .	Croton oblongifolius, *Roxb.* .	Kurti, Konya, Kuli .	Common almost everywhere. It is used for fencing.
173	Do. . .	Trewia nudiflora, *Linn.* . .	Gara lohadaru . .	Met with in valleys in Saranda. The wood is sometimes used, instead of Kasamar, for making drums.
174	Do. . .	Mallotus philippinensis, *Mull. Arg.*	Roroi	Common in valleys; is regarded as useless, but gives good shade and is occasionally seen in "topes," as at Belsian.
176	Do. . .	Ricinus communis, *Linn.* . .	Bindi, Chanki, Lanni, elandi.	Occasionally cultivated for the sake of its oil-seeds and leaves.
176	Do. . .	Jatropha glandulifera, *Roxb.* .	Verenda . . .	Common as a hedge plant; uses the same as those of *J. Curcas.*
177	Do. . .	Jatropha Curcas, *Linn.* . .	Kulejera, totkabendi kujuri.	Found occasionally planted near villages as a hedge plant. Oil is made from the seeds and used for burning and for anointing the body.
178	Salicineæ . .	Salix tetrasperma, *Roxb.* . .	Nachal . . .	Found along river banks in Saranda It is said to be of no use.
179	Palmæ . .	Phœnix acaulis *Roxb.* . .	Kíta	Common in forests and waste lands throughout Chota Nagpore. The leaves are much used for making mats.
180	Do. . .	Phœnix sylvestris, *Roxb.* .	Khajúr . . .	Cultivated for the sake of its sugary sap. The leaves are also used for making mats and baskets, and the wood occasionally for building.
181	Do. . .	Borassus flabelliformis, *Linn.* .	Tali	Common near villages. The wood is sometimes used for building and for water channels.
182	Graminem .	Bambusa Tulda, *Roxb.* . .	Pepse mad . . .	Found in Singhbhoom, generally in the valleys. It is used for building and fencing, &c. Flutes are also made of the smallor stems.
183	Do. . .	Bambusa arundinacea, *Retz.* .	Katanga-mad . .	Found in South Lohardugga and in Saranda, but is not common. It is used for walking sticks and for general purposes.
184	Do. . .	Bambusa, sp.	Roa-mad, Dhonok-mad .	Cultivated; chiefly valued for making bows.
185	Do. . .	Dendrocalamus strictus, *Nees.* .	Buru-mad, Saring mathan.	Found on the hills in most parts of Chota Nagpore, and is used for building, fencing, baskets and mats, walking sticks, spear shafts, axe handles, &c.
186	Do. . .	Dendrocalamus sericeus, *Munro* .	.....	Parasnath.

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